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# TORREYA

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## INDUCED HERMAPHRODISM IN ACER NEGUNDO L.

BY CHARLES GORDON FRASER

In the sixth edition of Gray's Manual the ash-leaved maple or box elder is classified as *Negundo Aceroides* Moench., in a separate genus following the genus *Acer*. The first and one of the chief distinctions made is that the genus *Acer* is polygamodioecious, whereas *Negundo* is dioecious. Sargent (1905) makes the same distinction, describing *Negundo* as: "Staminate and pistillate on separate trees, . . . (stamens) none in the pistillate flower." In the seventh—and latest—edition of Gray's Manual this species is given the classification *Acer Negundo* L., but is placed in a second sub-division of the genus which is characterized as "*strictly dioecious*." Britton (1908) classifies this form as *Acer Negundo* L., with the synonym *Negundo Aceroides* Moench., and description: "Staminate and pistillate flowers on different trees."

On May 15, 1909, the writer came across an exception to the strict dioeciousness of *A. Negundo*. By the banks of a creek near Weston, Ontario, in a grove of this species, a tree was found on one limb of which hermaphrodite flowers were borne in considerable numbers. For at least four years previous, as could readily be determined by the winter bud scars, and the *persistent pedicels*, the tree had fruited copiously, this particular limb not excepted. On the main part of the tree, which was searched carefully, only normal pistillate flowers were found. By some accident the limb in question had been partly split from the trunk, in such a way as to leave about one fifth of its bark and cambium intact. Fig. 1 shows the general appearance of the tree with the partly detached branch; fig. 2 indicates the

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FIG. 1. Hermaphroditism in *Acer Negundo* L.  
See descriptions of figures in text.

nature and extent of the wound. In 1910 all the other branches bore fruit as usual, but this limb produced a comparatively small crop of seeds, and these of a poor quality. The winter buds in the spring of 1910 did not appear vigorous, but the writer had no opportunity of examining the flowers or the fruit during that season, nor in the spring of 1911. This winter, however, a fair crop of seed was found on the branch.

Besides having both stamens and carpels the flowers of this branch deviated from the normal types in other respects. Of these types Sargent says: "Staminate fascicled on slender hairy pedicels,  $1\frac{1}{2}$ '-2' long, the pistillate in narrow drooping racemes; calyx campanulate in the staminate, much smaller in the pistillate flower." Britton states that "the staminate ones are on hairy drooping pedicels, have a 5-lobed calyx, and about 5 stamens, with long pointed anthers much projecting beyond it; the pistillate flowers are in smooth or hairy drooping racemes, which greatly elongate as the fruit matures, have 5 linear oblong sepals, a slightly hairy ovary, two slender styles, and no stamens." Figs. 3 and 4 illustrate the normal male and female inflorescences respectively. In fig. 5 a hermaphrodite spray is shown from the injured branch at the same magnification as figs. 3 and 4, while the same spray appears at a higher magnification in fig. 6. The inflorescence represented in the latter figure resembles the drooping raceme of the normal carpellate more than the fascicle of the normal staminate. The structure of the flowers, moreover, is different from the two ordinary types. The calyces resemble the larger and more campanulate calyces of the staminate flowers, but in their deep lobing they are more like those of the pistillate. Finally, the normal number of stamens is given by Gray as 4-5, by Sargent as 4-6, and by Britton as *about* 5. The number of stamens in the flowers shown in fig. 6 varies from 0-5, the commonest numbers being 3 and 4. These hermaphrodite flowers, then, in respect to the character of the inflorescence, the structure of the calyces, and the number of the stamens, are intermediate between the normal dioecious types.

The condition described is evidently teratological, but since wounding is known in many cases to cause reversion to a more

primitive type of structure,\* it suggests that *Negundo* in its origin has a very close relationship to the genus *Acer*—probably a highly specialized form in this genus. In this connection the simpler, more *Acer-like* foliage of the seedling of *A. Negundo* is to be recalled. This phenomenon and the occurrence of the hermaphrodite flowers above recorded lends support to the classification which places *Negundo* in the genus *Acer*.

In conclusion I wish to express my heartiest thanks to Mr. R. B. Thomson for his interest and assistance in the preparation of this paper.

UNIVERSITY OF TORONTO,

February, 1912

#### REFERENCES

Britton, N. L., *North American Trees*, New York, 1908.

Sargent, C. S., *Manual of the Trees of North America*, Boston and New York, 1905.

## THE FLORA OF NORTHAMPTON COUNTY, PENNSYLVANIA

BY WILBUR L. KING

(Continued from *May Torrey*)

### CYPERACEAE

CYPERUS FLAVESCENS L. In marshy grounds, Easton. (Porter.)

CYPERUS RIVULARIS Kunth. At Island Park. (Porter); in wet soil along canal at Bethlehem. Sept. 1, 1899.

CYPERUS INFLEXUS Muhl. In wet, sandy soil. (Porter.)

CYPERUS DENTATUS Torr. Along canal in wet sandy soil at Bethlehem, Sept., 1898. Specimens with flower scales modified into tufts of small leaves have been found.

CYPERUS ROTUNDUS L. On ore dumps in Bethlehem Steel Co.'s yard. Reported in *Torrey Bulletin* Jan., 1892.

CYPERUS ESCULENTUS L. In wet soil and in meadows along Monocacy creek near Bethlehem. Common. Aug. 5, 1899.

CYPERUS STRIGOSUS L. In moist sandy soil and in meadows at Bethlehem. Sept. 9, 1896.

CYPERUS FILICULMIS Vahl. Along Lehigh river. (J. A. Ruth.)

DULICHUM ARUNDINACEUM (L.) Britton. In moist soil at Island Park. Aug. 25, 1902.

ELEOCHARIS OVATA (Roth.) R. & S. On muddy shores of Lehigh river at Bethlehem.

ELEOCHARIS GLAUDESCENS (Willd.) Schult. In moist soil along Lehigh canal at Bethlehem. June 20, 1899.

ELEOCHARIS ACICULARIS (L.) R. & S. On muddy banks of Lehigh river, Bethlehem. Aug. 22, 1899.

\* In certain acacias, pines, junipers, etc., wounding causes reversion to the seedling type of foliage which is considered ancestral.